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# MONTANA OVERLOOK

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# Montana Overlook

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# OVERVIEW

Montana -- the nation's 4th largest state -- got its name from the mountain ranges that dominate the entire western third, as well as other parts of its land area. The great spine of the Continental Divide enters the state in Glacier National Park on the northern border, and continues southerly until it becomes the boundary between Montana and Idaho for 275 miles, finally leaving the state in Yellowstone National Park on the southern border.

It has also been known by other names: The Big Sky Country; the Land of the Shining Mountains; the Treasure State. The Great Seal of the state bears witness, in Spanish words, to the fact that its gold and silver were historically important parts of that treasure; but it has other even more important ones. The largest contributors to its modern economy are the renewable resources of timber and wheat and fat cattle, beets and barley, sheep and hogs. The list of treasures, however, includes ores of copper, lead and zinc; growing discoveries of oil and natural gas; vast deposits of lignite and sub-bituminous coal; and a sizeable inventory of other non-metallic minerals with even a variety of semi-precious gemstones.

Although the difference between Montana and the islands of Japan are more striking than their similarities, it is interesting to draw some comparisons. In land area, for example, they are the same except for a few hundred $km^2$, or a mere 170 square miles (Montana, 377,824 $km^2$; Japan, 377,384 $km^2$). They share impressive mountain scenery and snow-fed lakes and streams, but finding further similarities becomes more

difficult. In population density, Montana averages less than two people per $km^2$, compared with nearly 280 in Japan. There are no cities with populations of as many as 100,000 in the entire state, while Japan has over 140 that size or larger. About one-fourth of Montana is forested, compared with nearly 70 percent of the area of the Japanese islands. Rimmed with hundreds of miles of coastline, much of Japan, of course, is at sea level, while land-locked Montana's lowest point is 1,800 feet or 549 km. above sea level.

Montana is peerless recreation country, with plenty of action for the hunter and fisherman, the snow-sports enthusiast and the sightseer. Both the Columbia and the Missouri rivers have their headwaters in the highlands of the Treasure State. Its largest body of water is held back by Fort Peck Dam on the Missouri, but there are sparkling lakes and reservoirs throughout the state, where the runoff from winter snows is caught for a time to serve as sources of power as well as supplying water for recreation, irrigation, and industrial needs. There is 126,000-acre Flathead Lake in the west, Hungry Horse and Libby in the north and northwest, and Yellowtail in the southeast -- to name only the largest bodies of water. There are 400 miles of rivers that have been classified as the finest "blue ribbon" trout streams. A third of Montana's 147,000 square miles (381,000 $km^2$) are publicly owned federal, state, and Indian lands, and vast tracts of these are specially designated "wilderness areas," untouched and untouchable by saw or blade or bulldozer; preserved in perpetuity for the outdoorsman on foot or horseback.

Montana is proud of its colorful past -- and with good reason. But deserted mining towns and abandoned farm homesteads are not what characterize the Montana of today. It seeks to combine reasonable development

of its resources, with preserving and maintaining the unspoiled grandeur of its mountains, rivers, and prairies, and the familiar ways of life of its people. It offers opportunities in many products, in many ways, at many levels, from raw materials to finished products. In the following sections are described in more detail both the kinds of materials and products, and the kinds of investment and production opportunities it offers the purchaser, the entrepreneur, and the investor.

Grain-Wheat-Barley

Wheat and barley production has long been known as Montana's "golden bonanza." Montana has a historic average annual production of 100 million bushels of high protein, hard spring and winter wheat with some durum.

Normally, total production is composed of 50 to 55 million bushels of winter varieties, 40 to 50 million bushels of spring varieties, and approximately 5 million of durum. Barley production averages between 50 and 60 million bushels which includes both quality livestock feed and malting types.

With the availability of suitable crop lands, resulting from changes in the United States farm policy and change in "summer fallow" cropping patterns, Montana's grain production could be expanded by some 40 million bushels on a short term basis. Such expanded production could be in winter wheat, spring wheat, feed barley, or malting barley, dependent upon the demand of the market.

All sections of the international grain trading and milling industry are knowledgeable of the quality of Montana wheat and barley. Over last year, our Dark Northern Spring had a test weight of 60 plus pounds, with 15.4% protein. Dark Hard Winter testing showed a test weight of 61.9 pounds with 13.1% protein. Quality characteristics of Montana feed barley include high protein and freedom from molds and fungi. In addition, much of our production is of two row varieties which are larger seeded and therefore favored as livestock feed. Malting barley as grown in our high dry climate is of superior color, has plump kernels and low protein; all of which are viewed as desirable factors by maltsters.

In recent years, 50 to 60 percent of Montana's wheat production has entered the international export market with Japan being the major market. In the case of barley, it is estimated that approximately 30 percent of our annual production is shipped out of Montana of which a portion enters export channels.

The Montana grain industry is capable and willing to expand trade with Japan, who based on past experience has achieved "favored customers" status within the industry.

Certified Seed Potatoes

Since 1972, Montana seed potato growers have succeeded in building and maintaining a certified seed program of unequaled caliber. The Montana Potato Improvement Association is responsible for supervising the program which consists of formulating rules and regulations and carrying out the inspection services. The Association is governed by a four-member Board of Directors which are elected from the Association membership. All certified seed growers are members of the Association.

The potatoes are grown in fertile valleys surrounded by towering mountains that reach to 11,000 feet. The growers not only enjoy the aesthetic value, but appreciate the isolation barriers provided by the mountains. For this reason, Montana has rarely experienced green peach aphid infestations. Russet Burbank predominates as the leading variety, with 4,602 acres certified in 1973. Norland, Norgold Russet, White Rose and LaSoda are certified varieties grown in lesser amounts.

In 1969 Montana expanded the certified program to grow seed potatoes free of latent viruses. Each field entered for virus free certifications undergoes rigid field and cellar inspections. Also, leaf samples are collected and are processed under serological procedures. In 1970 there were 185 acres certified as latent virus free and this was increased to 1,664 acres in 1973. Results from this program are very favorable as growers have reported a ten to twenty percent yield increase and the incidence of blackleg is this stock is negligible. An increase to 2,500 acres in anticipated for 1974.

MONTANA CERTIFIED SEED POTATO PRODUCTION

| Year | CERTIFIED SEED STOCK Acres | or Hectares | VIRUS FREE STOCK Acres | or Hectares |
|---|---|---|---|---|
| 1969 | 4,293 | 1,738 | -0- | -0- |
| 1970 | 4,783 | 1,936 | 185 | 75 |
| 1971 | 5,512 | 2,232 | 510 | 206 |
| 1972 | 4,871 | 1,972 | 636 | 257 |
| 1973 | 4,613 | 1,868 | 1,664 | 674 |
| 1974[e] | 5,000 | 2,024 | 2,500 | 1,012 |
| 1980[f] | 20,000 | 8,097 | 10,000 | 4,048 |

[e]Current estimate for next session's production.

[f]Projected short-term production response to new market demand.

The above table shows a steady growth in the total production in seed potatoes. However, of equal importance is that "total certified seed potato" acreage could be increased by four hundred percent over the next five years. With approximately 80% of the total certified potatoes currently exported as seed to other states, regions and countries, seed growers are familiar with an exportive market structure. The experience and immediate increased production capability together with a superior quality product are advantageous requisites for new export trade in the Japanese market.

Montana is the largest producer of truly premium quality honey. Throughout the American honey industry, Montana is known as the very heart of mild-flavored, heavy-bodied, clover honey production. Presently, most commercial honey packers in the United States consider Montana honey to be of "too superior" quality to pack directly into consumer containers. It is used to blend with inferior flavored and high moisture honeys of other regions.

Approximately 8 million pounds of delicate clover flavored honey, with very low moisture, is produced annually. The primary and predominate source of nectar are wild yellow sweet clover and alfalfa. The combination of the two floral sources are ideal for honey with the delicate clover "tang".

Quality statistics contained in the following chart show the average color rating and moisture content for Montana honey is significantly superior to the national average. The reliability and uniformity of quantities of honey in excess of one million pounds with "P fund" color gradings averaging 20mm or less cannot be matched anywhere in the world.

MONTANA HONEY

| Year | Colonies | Production Yield Per Colony | Total |
|---|---|---|---|
| 1969 | 77,000 | 125 lbs. | 9,625,000 lbs. |
| 1970 | 76,000 | 105 | 7,980,000 |
| 1971 | 74,000 | 55 | 4,070,000 |
| 1972 | 74,000 | 110 | 8,140,000 |
| 1973 | 78,000 | 101 | 7,878,000 |
| 1980[f] | | | 10,800,000 |

QUALITY

| Index | National Average | Montana Average |
|---|---|---|
| Color (P fund scale) | dark side of white | light half of white |
| U.S.D.A. Color Scale 0 to 9 (light to dark) | 5.25 | 2.0 |
| Moisture Content | 17.2% | 16.1% |

[f]projected short term production response to new market demand.

Montana is one of the few states with major growth potential for honey production. Available uncultivated areas and increasing utilization of available water offers ideal sweet clover forage areas. With continued leadership in applying improved management practices, it is estimated that honey production can be increased by 36 percent within five to six years.

The structure of honey marketing consists of individual producers' direct sales and contact sales to out-of-state processors accounting for approximately 50 percent of the total. It is noteworthy that Montana has the first fully operational bulk honey handling facility. This operation is capable of supplying honey in tank truck and carload tanker lots of 45,000 to 110,000 pounds with further experience in unitized container shipments for export. This particular segment of the industry represents the remaining 50 percent of total marketings.

Montana's honey industry with its recognized quality, superiority, availability of supply, production potential and a marketing structure that is capable to readily serve the export market provides an excellent potential for new foreign trade with Japan.

Most grain marketed in export channels is sold on a specific quality and grade basis. With our large production we have substantial quantities of wheat and barley in a wide range of specific classes, grades, and protein categories. With this capability, Montana grain interests are in a position to serve markets utilizing identity preserved conditions to insure and guarantee specific delivery contract specifications.

The recognized ability of Montana's grain industry to effectively supply foreign markets, to expand production to serve new or expanded markets, to provide a wide range of quality of product, and to market within an identity preserved structure is the foundation for serving the sophisticated Japanese market.

Beef

Montana is frequently depicted as a mountain meadow with a herd of quality cattle peacefully grazing in lush grass. This picture is not only just beautiful but is a common scene, for as the table shows, there are 3,380,000 head of cows spread over millions of acres of rangeland. The larger beef herd which ranks eighth in the nation, produced 1,730,000 calves in 1973, more than any of the other eleven western states.

It is important to note that while the state has large cattle numbers, the Montana beef industry has for many years been recognized for its leadership in producing superior quality animals. This reputation for superior purebred breeding stock, choice type of feeder cattle, and high quality commercial herds is not an unsupported claim based on just having large numbers. The industry and its representative agencies have always been and continue to be innovators in diseases eradication programs, performance indexing, artificial insemination, and purebred herd development.

Montana has the most stringent quarantine regulations and strongest disease control authority in the United States. Livestock health officials, with the support of the industry, initiated scabies control programs in the early 1900's, recognized and pursued burcellosis eradication, and conducted control programs for bovine tuberculosis. These programs and others like them have provided Montana cattle with "scabies free," "burcellosis free," "bovine tuberculosis free" designations and an excellent overall health reputation.

For nearly fifty years the Montana beef performance indexing associations have tested the heritability of economic traits of beef cattle. This program selects breeding stock which are genetically superior in the feedlot and in carcass quality. Montana beef herds now have a higher percentage of performance indexed individuals than any state in the nation. It is natural that with the index information on superior sires and the availability of such sires or their semen, artificial insemination is incorporated in herd improvement projects to a greater degree than in most other areas.

The "premium" of purebred seed stock beef cattle of the United States are in Montana. In the last two years, our breeders have been the number one producer of quality purebred seed stock in the nation and the world. In the last two years, the National Steer Champion, the National Champion Polled Hereford Bull, the National Champion Polled

Hereford Heifer and the National Champion Shorthorn Bull came from Montana. People from all over the United States and the world have come to recognize Montana for premium Charolois, Angus, Hereford, Polled Hereford, Shorthorn, Simmental, Main Anjou, and Limosine cattle.

Over 500 Angus breeders, 250 Polled Hereford breeders, 92 Shorthorn breeders, 185 Charolois breeders, and 562 Horned Hereford breeders, registered over 47,000 calves in 1973. This level of production gives the buyer tremendous opportunity for selection.

Montana ranchers have traditionally supplied quality feeder cattle to other feeding areas throughout the country. Out-of-state shipments of feeder animals total approximately one million head each year. This market pattern is changing as more interests recognize the availability of the basic needs: available feed grains, quality feeder cattle, desirable climate, good locations; and the economic potential of cattle feeding within the state.

The number of cattle placed in feedlots has more than doubled over the last ten years, 112,000 head in 1963 to over 220,000 head per year for the last three years. This increase in cattle fed reflects a growth in the size and the number of feedlot facilities. A part of this growth is the expansion of facilities available to feed cattle on a custom contract basis.

Montana barley production averages approximately 60 million bushels per year. Of this production some 30 percent is shipped out-of-state for utilization. With these major resources available, there is no area in the United States which offers more potential for growth in cattle feeding than Montana.

The Montana beef industry includes modern packing plants which can process the beef to sides, loins, and special cuts for direct shipment to overseas markets. So whether the need in Japan be for purebred cattle, quality commercial feeder cattle, contract custom feeding, sides of beef or processed beef, Montana is able to fulfill your requirements.

MONTANA BEEF

| | 1969 | 1970 | 1971 | 1972 | 1973 | 1974 |
|---|---|---|---|---|---|---|
| | | | (Thousand Head) | | | |
| Cattle and Calves Inventory | 2,984 | 3,014 | 3,165 | 3,165 | 3,197 | 3,380 |
| Calf Crop | 1,508 | 1,535 | 1,582 | 1,630 | 1,730 | |
| Cattle on Feed | 172 | 199 | 270 | 242 | | |

Additional information in statistical and information section.

Market hog production in Montana is a strong and growing industry. Its strength and aggressiveness is supported by a high level of management experience and substantial numbers of young producers, many of whom are college graduates, entering the industry on a permanent basis.

The Montana Pork Producers Council, a producer's organization, is active in helping these producers through education and market development projects. Efforts by the Council are serving the industry in achieving its full potential.

Montana has quality hogs and therefore, produces superior pork carcasses. Data from the "National Barrow Show" and the "Montana Northern International Livestock Exposition" provides a quantitative comparison of quality factors. The top 49 hogs at the national show compared to the top ten animals in the Montana competition is as follows:

| | National | Montana |
|---|---|---|
| Inches of back fat | 1.20 | 1.18 |
| Square inches of loin eye | 5.48 | 5.29 |
| Percent of ham | 16.0 | 17.1 |

In addition, 85 percent of four full loads of hogs in a recent carcass project were in U.S. Grades 1 and 2, which is above average quality.

Pork production in Montana is increasing. From 1950 to 1965 the pig crop fluctuated around 250,000 head per year. From 1969 to 1973 the pig crop ranged from 319,000 to a high of 430,000 in 1971 to 357,000 this last year and illustrated a strong increase in the production trend.

Approximately one-half of the 357,000 hogs produced in Montana in 1973 were shipped out-of-state, either live or as pork. It requires about 226,000 hogs to produce the pork consumed in the state each year. Due primarily to the marketing structure of the United States supermarkets, a large portion of this local demand is supplied by processed pork imported from Midwest sources. Thus, Montana is in a solid net export position able to serve new markets.

New varieties of barley are being developed by the Montana Agricultural Experiment Station which are more efficient and require less supplements for hog rations. Tests in several of the new varieties have exhibited improved growth and efficiency in pigs. Such new technologies in association with Montana's barley production, which averages 60 million bushels per year, provide an excellent input resources base for substantial increase in pork production and processing. Estimates by Pork Council personnel are that if returns to resources are such that one-half of the barley now shipped out-of-state were to be utilized in hog production, Montana could produce some 1,000,000 hogs for processing annually.

The hog slaughtering facilities in the state include modern, well-equipped, federally-inspected plants with varying capacities. Eleven of the 28 federally inspected slaughter plants in Montana indicate a capacity of processing 2,800 more hogs per week at current levels of production. Many of these facilities which are of a smaller size are capable and interested in slaughtering hogs on a custom basis, giving attention to special requirements needed in cutting pork specifically for the Japanese market.

The Montana pork industry has steadily increased its production of quality hogs to a level which can supply additional export markets on a continuing basis. Further, the producer's interest through their associations in market development and experience in coordinating the purchasing, processing and selling of pork provides a unique flexibility, within the market structure, to supply the growing Japanese demand for pork.

Sheep

Montana's sheep hold a distinct advantage over those produced in most of the other states principally because of its dual purpose breeds. The greater majority of Montana's sheep are of the white-face breeds which produce high quality wool that is very much in demand, and also produce a very acceptable feeder lamb for delivery to feeding operations.

The average ewe produces ten pounds of wool per year and at least one lamb. This total production of 8,501,000 pounds of wool and 625,000 lambs in 1973 ranks Montana sixth nationally.

Like that of other states, Montana's sheep industry has experienced a measurable decline over the past ten years, with sheep number reflecting an approximate 46 percent decrease in the state. Increased use of synthetic fibers causing less demand for wool, restrictions on available range to graze sheep, increasing predatory animal problems have all had a cawsal effect on the decline of "range oriented" sheep production.

Montana's sheep industry is launching itself into a plan of performance -- testing its seed stock for use in commercial and purebred operation. They have introduced a system of performance -- testing in the annual "State Ram Sale" which markets over 500 of the top quality rams in the state each year. Other positive factors within the structure of the industry are increases in farm flock operations which are less affected by problems of predators and lack of large tracts of range; new breeds, with emphasis on multiple births are gaining acceptance with the industry, and growing interest in confinement and integrated systems to accelerate production.

The Montana sheep industry can competitively serve the needs of the Japanese market for lamb products and the availability of established wool marketing pools, providing Japanese buyers direct access to substantial qualities of Montana wool.

## MINERALS

Montana's mineral wealth was first touched in 1852, with the discovery of gold that brought thousands of fortune seekers to such boom and bust towns as Bannack, Elkhorn, Virginia City, Last Chance Gulch, etc. The mining and mineral industry in the ensuing century passed through many phases and is now a thriving mature industry contributing over $350,000 annually to the Montana economy.

While gold and silver mining launched the mineral industry, efforts were later directed to copper, petroleum, limestone products and coal which form the basis for the Montana minerals industry today. The Anaconda Company, a major world-wide producer of copper, has extensive operations in Montana supported by their modern open pit mine in Butte. Coal mining, recently revived, is discussed in a separate section in this report.

The table on page  is a summary of the mineral production in terms of quantity and value of production in Montana for the years 1972 and 1973. Principal Montana mineral producers showing the type of operation, production process, and plant and mine location are shown on page .

The referred to tables are evidence that Montana has a strong mineral industry, but exploration for minerals continues and is actively pursued by both the pick and shovel prospector and major sophisticated metal producing companies. A wide variety of minerals have been discovered in Montana, some in commercial grade deposits, others in non-commercial deposits. As world wide demand grows and technology and economic conditions prevail, Montana will surely play its role in providing the modern industrial society with basic raw materials. Listed below is a brief summary of minerals found in Montana.

ANTIMONY - Known deposits exist in western and southwestern Montana, In 1971, U.S. Antimony established a mill and began production in Sanders County.

COPPER - The major developed copper property is in Butte, Montana, where Anaconda has a fully integrated operation, using ores from open pit and deep mining. Exploration has been actively pursued by Anaconda, Freeport Minerals, Phelps Dodge, Kennecott Copper Corporation and others. Deposits showing commercial potential are known to exist in other areas of the state.

CHROMIUM - More than 80% of the potential Chromite resources of the U.S. are in Montana. Nine hundred thousand tons of ore have been mined, concentrated and stockpiled in southern Montana, however, other sources throughout the world at more competitive prices have precluded the utilization of this ore.

IRON ORE - One active mine is operating in Broadwater County producing approximately 15,000 tons annually for use by a cement manufacturer located nearby. The iron ore deposits are of significance in the state. Titaniferous ore in large deposits are located in the Northcentral part of the state. In southwestern Montana, there are several magnetite deposits grading 30% Fe. One property is currently under consideration for a milling operation to produce concentrates of 75% Fe. Extensive tonnages have been identified. Smelter slag piles owned by the Anaconda Company and ASARCO contain tens of millions of tons of ores that grade about 45%.

THORIUM and RARE EARTHS - Thorium has been produced from numerous placer deposits in Montana. The largest deposits of Thorium and Rare Earths occur in western Montana. Demand for these minerals has caused

exploration activity to intensify.

TUNGSTEN - Has been produced for the machine tool industry from numerous small lode and some alluvial deposits. At the height of the U.S. Government stock piling program, Montana ranked fourth among producing states. Only a few tons of Tungsten concentrate were produced in 1973. Prospects are bright for this mineral.

URANIUM - Has been produced from the Pryor Mountains in Bighorn and Carbon Counties. If the need were great enough, very large quantities could be recovered from lignite deposits of eastern Montana and from the phosphorite deposits of western Montana.

NICKEL - Presently Nickel is recovered as a by-product from Butte copper ore. Significant deposits are located in southern and southwestern Montana.

ZINC - Production is derived largely from by-product recovery of ores mined by some 26 lead-zinc-silver mining operations in the state. Until a few years ago, large quantities were mined in the Butte District. Current world price increases for Zinc make these deposits more attractive.

ASBESTOS - Small amounts of asbestos have been marketed from time to time from Montana. The known deposits exist in Beaverhead, Gallatin and Madison Counties in the southwest and Lincoln County in the northwestern part of the state. The deposits containing high quality asbestos are limited, however, the extensive deposits are of a lower quality.

BENTONITE - International Mineral and Chemical Corporation, and Hallett Minerals operate bentonite mines in Montana. Extensive deposits have been located and are being developed in the northern part of the state.

CLAY - Miscellaneous clays and shale for making heavy clay products, mainly building brick and tile, are mined by Lewistown Brick and Tile Company in Fergus County and by Lovell Clay Products in Yellowstone County. Undeveloped deposits of whitewear clay (dickite) of commercial quality are found in Fergus and Mussellshell Counties.

GYPSUM - Extensive deposits are found in the central and in the southwestern parts of the state. Despite the existence of exceptionally large reserves, only one deposit is being worked by U.S. Gypsum Corporation in Fergus County where they produce wallboard.

NATURAL GAS - Methane gas is available to nearly all Montana's major communities for both industrial and domestic uses. The Tiger Ridge field in Northcentral Montana is the site of major activity. Several wells are producing and drilling activity is brisk. Much of the Tiger Ridge production is committed. The Belle Creek field in southern Montana was developed in the late 1960's.

PETROLEUM - The total value of production is about $150,000,000 per year. An estimated 45,000,000 barrels of oil was refined in Montana at 9 oil refineries in 1971. With the energy crisis, exploration drilling has increased recently.

OIL SHALE - The largest shale beds are located in southwestern Montana though not as large as those of Wyoming and Colorado. Montana's oil shale reserves are of real significance. Other deposits are located in Teton and Fergus Counties.

PEAT MOSS - Though small, this industry has been enjoying rapid growth over the past 15 years. Montana's organic peat is marketed in several states in the northwest and there is a strong interest to establigh markets overseas.

PHOSPHATE ROCK - Phosphate deposits exist in enormous quantity. One published source estimates reserves in excess of 24 billion tons in wouthwestern Montana. Cominco American Inc., mines and crushes phosphate rock in Powell County for manufacturing phosphate fertilizer in British Columbia. The rock has been mined in Beaverhead, Silverbow and Granite Counties also.

SAPPHIRES - Have been recovered in their natural form from gold dredging spoils in western Montana for serveral decades. Colors are blue, pink, yellow, green, violet, and some are colorless. The most highly prized stones are produced from the famous Yogo Mine located in Judith Basin County in Central Montana. A major mining operation is now underway there.

VERMICULITE - The Zonolite division of W.R. Grace Company is the principal producer of vermiculite in Montana; located in the northwestern part of the state. The company mines and mills crude ore at the mill site and ships mainly out-of-state for processing. One deposit of commercial grade is located in Madison County and the owners are striving to develop the deposit.

TALC - Montana has possibly the greatest reserve of steatite grade talc in the U.S. Two companies, Pfizer Company and Cyprus Mines,

mine talc at four mine sites located in Madison County. There are several deposits in Montana and they all occur within an area of about 50 square miles in Beaverhead and Madison County.

Other minerals found in Montana include:

| | |
|---|---|
| arsenic | barite |
| beryllium | bismuth |
| cadmium | calcite |
| columbium | corundum |
| diatomaceous earth | feldspar |
| fluorite | graphite |
| kyanite | sillimanite |
| dumortierite | lead |
| limestone | magnesium |
| manganese | mercury |
| mica | molybdenum |
| perlite | platinum |
| pumicite | quartz |
| hallite | selenium |
| silver sulfate | sulfur |
| tin | titanium |
| vanadium | zirconium |

# COAL

(the following section on
coal has been published
separately as Coal Deposits
in Montana, IGR General Report PI103)

Mining operation at Colstrip shows operation of Western Energy Co. Low-sulfur coal seam is removed by loading shovel (foreground) into 100-ton coal hauler. Mounds visible at left and right are being reclaimed.

## Introduction

Montana's coal deposits have placed the Big Sky Country in the minds of many Americans as a source to help alleviate the current energy problem.

But what is the size of these deposits? Where do they lie? What is being done with them? What are some of the potentials?

The publication is designed to provide some of the facts regarding the coal deposits and current usages. It is not the intent to speculate about the future or delve into the economic, social or environmental problems, but rather simply to provide some of the basics upon which all the concerns are focused.

## Coal Sources

Although coal lies in scattered deposits throughout the State of Montana and has been mined for more than 100 years, by far the greatest amount, and virtually all the coal that can be profitably surface mined with current technology, is found in the eastern third of Montana.

This large coal source forms part of the Fort Union Basin which includes four states of the U.S.A. and a part of the Canadian Province of Saskatchewan. A large number of the deposits lie at shallow depths, and in beds thick enough to be obtained by strip mining. These beds consist of sub-bituminous and lignite rank. The map on page 13 shows the locations of approximately 42 billion tons of coal and lignite in 62 deposits surveyed, tested, and mapped so far by the State Bureau of Mines and Geology. The estimated tonnage does not include some additional 6 billion tons in deposits located on two Indian reservations.

With the map is a table (page 14) showing names, estimated available tonnages, ash, sulfur, and heat content of the coal, and acreages of each deposit surveyed. Relative thickness of the coal seams at depths less than 150 feet is indicated by the fact that these coal fields average nearly 37 thousand tons per acre.

A line on the map indicates where lignite coal, to the north and east, gives way to sub-bituminous ranks in three classifications. The description of the

various ranks, according to the classification system specified by the American Society for Testing Materials, is:

| Rank | Calorific Value Limits -- BTU per lb. |
|---|---|
| Sub-bituminous A | 10,500 - 11,500 BTU |
| Sub-bituminous B | 9,500 - 10,500 BTU |
| Sub-bituminous C | 8,300 - 9,500 BTU |
| Lignite A | 6,300 - 8,300 BTU |
| Lignite B | 6,300 BTU or less |

It has been pointed out by Groff and Matson of the Bureau of Mines and Geology that although sub-bituminous coal and lignite do not have the thermal value of higher rank bituminous coal, they are present in great abundance and are non-agglomerating. Since they are also more chemically reactive than bituminous, they have process advantages for some of the technologies of coal conversion.

## Current Production

Since 1970 the production of coal in Montana by strip mining has increased considerably. The accompanying table shows tonnages for 1971 through 1973, in the four counties where such mining occurs. In the case of Musselshell County, however, except for an experimental effort to surface-mine higher grades of sub-bituminous coal by contour surface mining, the relatively small tonnages are from underground operations.

In 1972 some 8 million tons of coal were mined, virtually all of which was from eastern Montana. In 1973 production neared 11 million tons; and according to the

Montana Energy Advisory Council staff headed by Lt. Governor Christiansen, present contracts for coal to be delivered (assuming that all four planned mine-mouth generators are constructed at the town of Colstrip) will raise production by 1980 to some 40 million tons per year.

TONNAGES OF SURFACE-MINED COAL, BY COUNTY:
MONTANA, 1971, 1972, 1973

| County | Number of Tons* Mined | | |
|---|---|---|---|
| | 1971 | 1972 | 1973 |
| Big Horn | (1) | 792,949 | 4,159,287 |
| Musselshell | 5,582 | 8,241 | 3,291 |
| Richland | 325,475 | 320,975 | 312,785 |
| Rosebud | 6,652,111 | 7,101,953 | 6,164,016 |
| MONTANA TOTAL | 6,983,168 | 8,224,118 | 10,639,379 |

(1) Decker Coal Company production did not start until 1971.
* 1 short ton = 2,000 lbs.

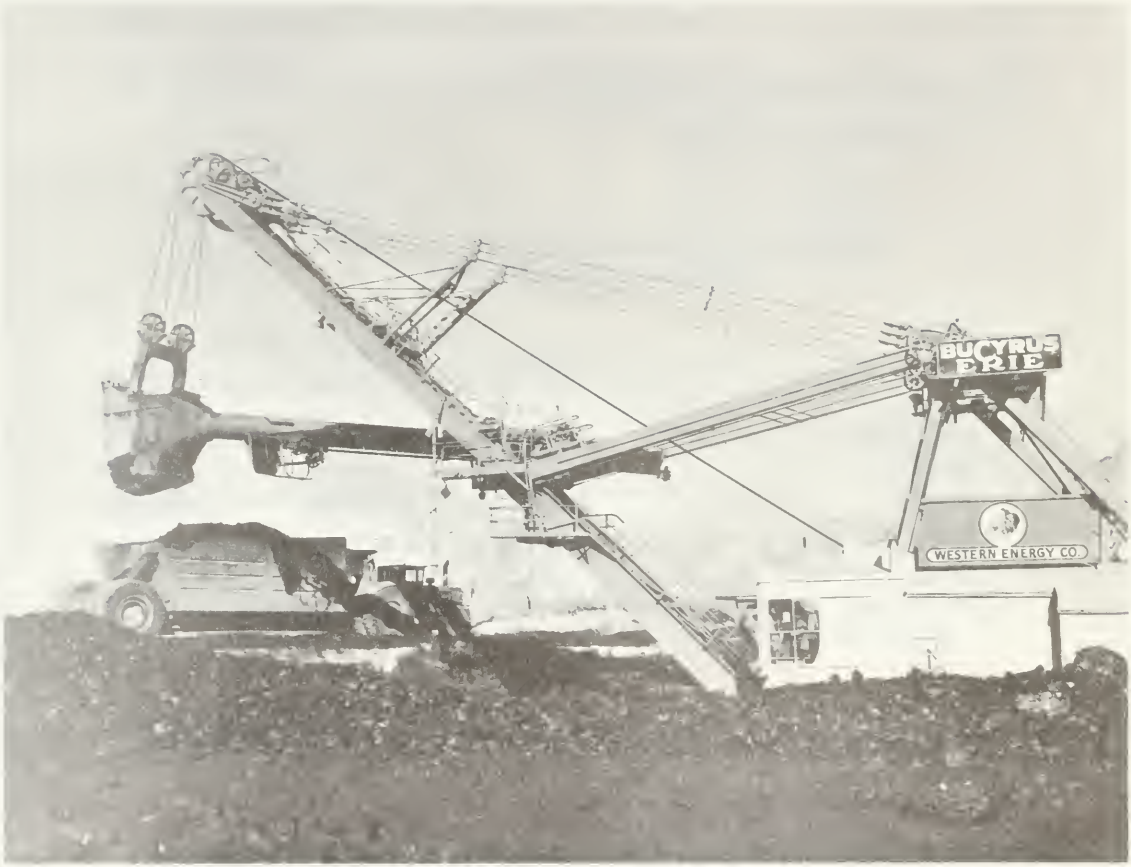
At the present time, surface-mined coal is produced at three of the 62 areas shown in the locations map. These sites are:

No. 1, Decker. The Decker Mine, operated by the Decker Coal Company.

No. 14, Colstrip. Two mines, approximately 5 miles apart, are currently producing coal from the same seams; Western Energy Company at the Colstrip Mine, and the Big Sky Mine operated by Peabody Coal Co.

No. 47, Breezy Flat. The Knife River Coal Co. produces about 320,000 tons per year of lignite for use in a generator operated by the Montana-Dakota Utilities Co., of which Knife River is a subsidiary.

Further information about these and other companies was presented in the September, 1973 issue of Montana Public Affairs, published at the University of Montana by the Bureau of Government Research.




Closeup of coal loading and 17-cubic-yard shovel filling a 100-ton coal loader, which will take its burden to the crusher, conveyor and loading tipple at the railhead.

The Knife River Coal Co., as noted above, produces lignite for the sole use of its parent company, Montana-Dakota Utilities, whose generating plant is at Sidney, Montana.

Western Energy Co. is a wholly-owned subsidiary of the Montana Power Company. Operation began in 1968 when the company took over operation of mines at Colstrip formerly owned and operated by the Northern Pacific Railroad Co. for its coal-fired engines. This company has increased production steadily, reaching more than 5.5 million tons in 1972. Montana Power Company's latest annual report shows that beginning in 1975, long-term contracts will result in further increased production, estimated by the company to reach 12 to 13 million tons by 1980.

Peabody Coal Co. is a subsidiary of Kennecott Copper Company. In 1969 it began producing from the Big Sky Mine in the Colstrip field, shipping 1-1/2 million tons by "unit train" to Minneapolis, under contract to the Minnesota Power and Light Company which uses the coal in its generation plants. Tonnage is expected to increase as a result of additional contracts which, beginning in 1974, will require production of 3-1/2 million tons per year.

Decker Coal Co. is a joint venture of Pacific Power and Light Company of Portland, Oregon, and Peter Kiewit Sons' Company headquartered in Omaha, Nebraska. Coal production by this company began in late 1972 and was approximately 4 million tons in 1973. It is shipped by unit train and barge to Chicago

for use by Commonwealth Edison Company in coal-fire steam-powered generators. Further contracts call for delivery of 180 million tons, or 7 million per year, over a 26-year period to Detroit Edison Company for use in Michigan generation plants beginning in 1976.

Westmoreland Resources Corp. is a four-way partnership between the Westmoreland Coal Company, Kewanee Oil Company, Morrison-Knudsen Company, and the Penn-Virginia Corporation. Its operation is in the Sarpy Creek field (#33 on the map), a 1.5 billion ton deposit located near the creek which gives it its name. It is 35 miles south of the town of Hysham on the Yellowstone River. Although the surface land was not owned by the Crow Indian Tribe, rights to the coal beneath it were, and were obtained by lease from the Tribal Council.

A rail spur to the site is under construction by Burlington Northern Railroad Company. It will be a 36-mile line running south from the main line along the Yellowstone River. Contracts for the coal mined have been negotiated with several mid-western utilities companies, and will be hauled by unit train from the Sarpy Creek, at the rate of approximately 4 million tons per year over a 20-year period, beginning this year.

Much of the land underlain by strippable coal in eastern Montana is owned by the federal government, which has granted leases on considerable acreages in the past. The Bureau of Land Management, however, has placed a temporary moratorium on further leasing of federal lands under its control.

It was reported by the Northern Plains Resources Council (Billings, Montana) that by March 1973, over 601,000 acres of land were under lease in 12 eastern Montana counties. Companies having 50,000 acres or more under lease included Consolidation Coal Company, Norsworthy-Reger, HFC Oil Company, Sentry Royalty Company, Western Energy Company, and Westmoreland Resources, and the list of individuals and corporations holding leases included 40 or more other names.

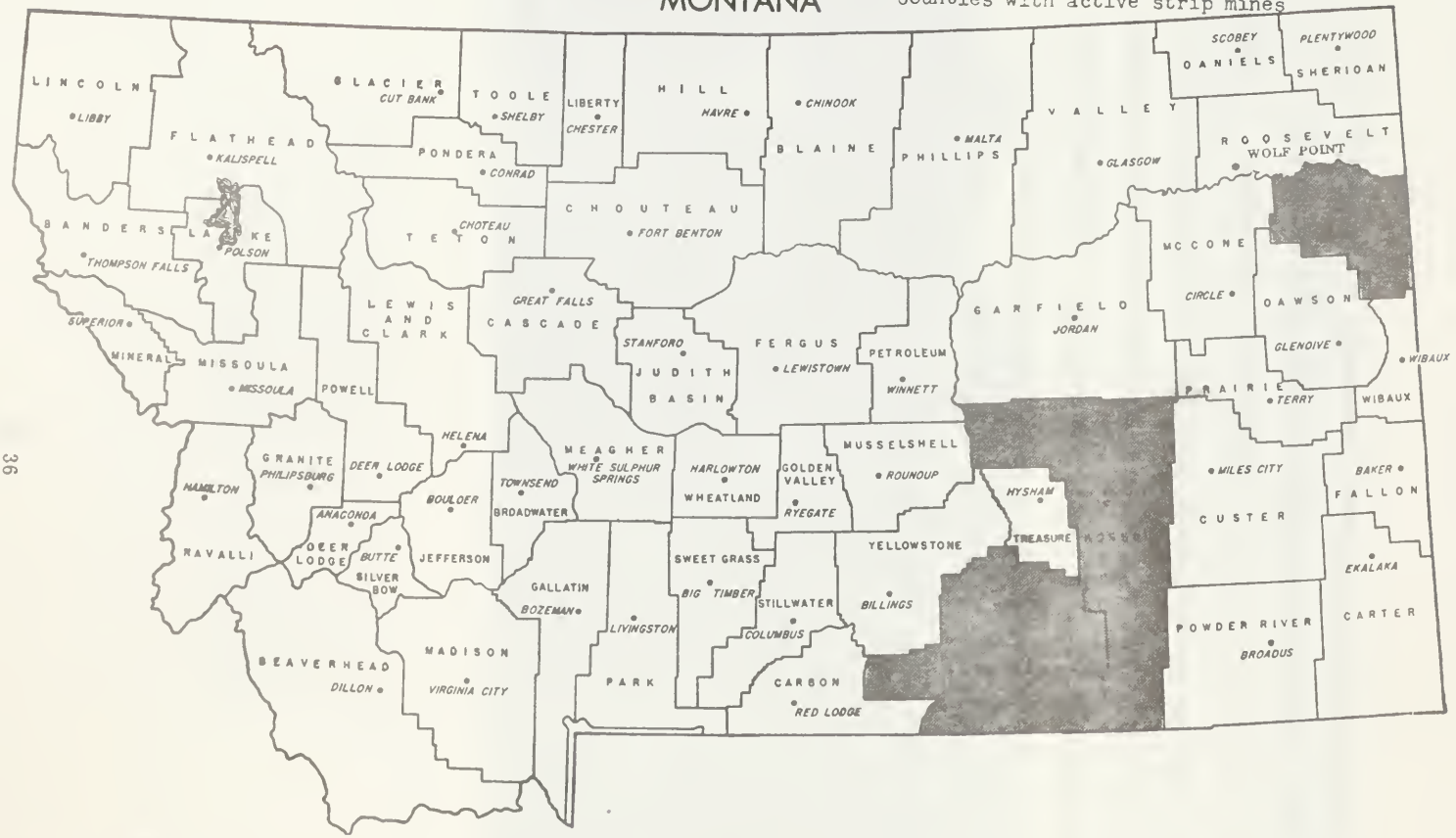
Coal Utilization

All the coal now being produced by surface mining in Montana is slated for power generation. The coal is going either into mine-mouth plants or to other states via unit train shipments. There has been considerable interest, however, in utilization of the coal for chemical conversion, to high-BTU "pipeline quality" gas, "producer gas," coal tars and liquids, and char.

Some of these conversion processes have the advantage over use of coal for power generation, which requires sizeable quantities of water for cooling and boiler feedwater makeup, that they may use relatively small amounts of water. Some of the deposits, particularly of lignite, are said to contain in themselves virtually all the water needed for the chemical reactions. All plants in the state utilizing these technologies will come under the requirements of the State Utility Siting Act, requiring justification for their location.

Reclamation program smoothes out mounds, restores vegetation with native grasses, grains planted on contoured land. Saving of topsoil and placing it back over fill material is a practice of Western Energy. Reclamation is under direction of Montana State University, which was engaged by Western Energy in 1968 before reclamation procedure for land like this had been researched.

Other current state laws require the reclamation of land disturbed by surface mining, and the submission of plans for such reclamation as well as the excavation plan, before a permit to commence mining can be issued. In general, the aim is to assure restoration of the land to the approximate contours it had before the coal was removed, and restocking of the land with vegetation similar to that which it supported before mining began. Experimentation has been underway for several years by the staff of Montana State University on restoration methods upon lands already strip-mined in past years, before regulations required reclamation.




No. 1052 — County Outline Map
STATE PUBLISHING COMPANY
Helena

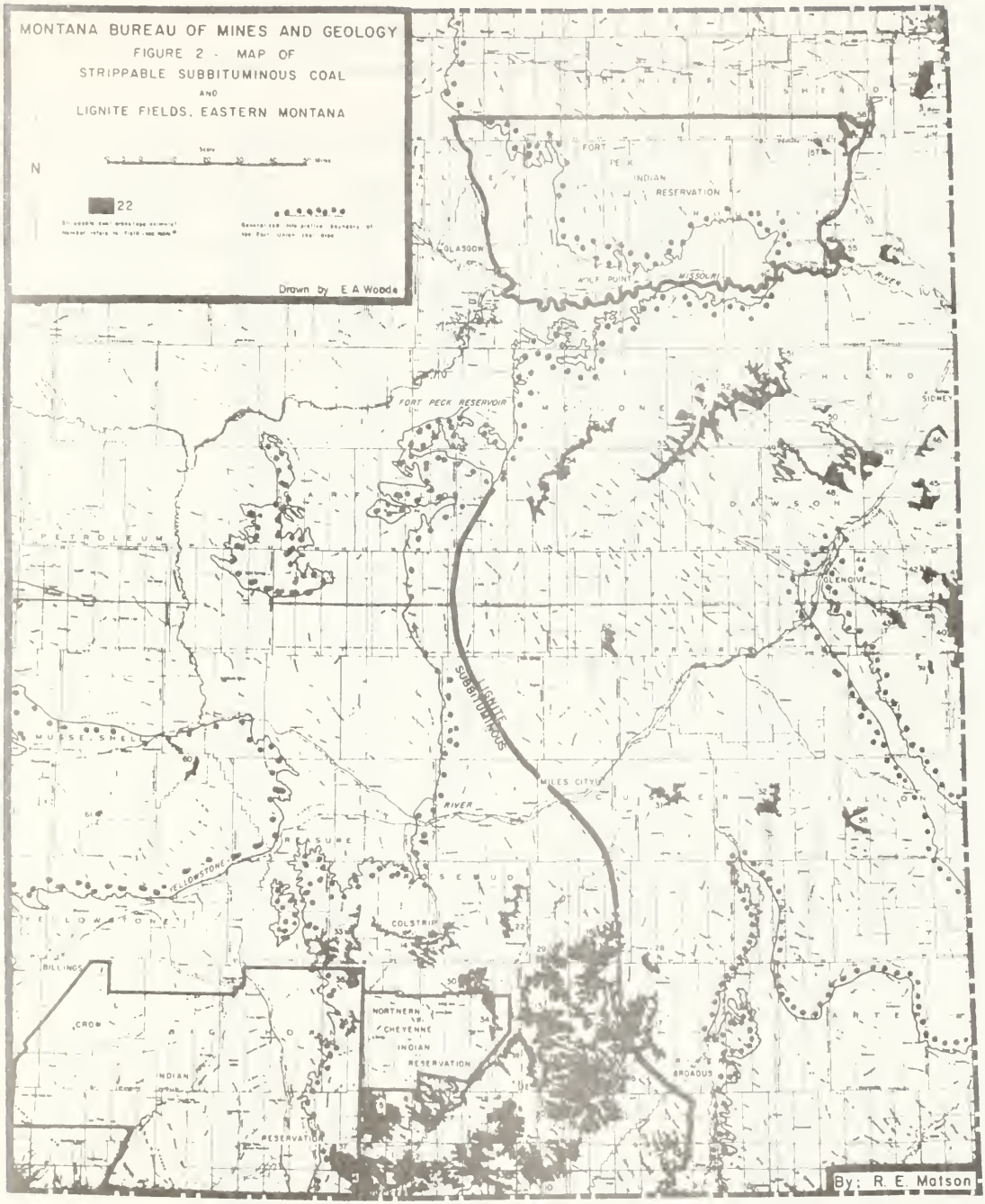

MONTANA BUREAU OF MINES AND GEOLOGY
FIGURE 2 - MAP OF
STRIPPABLE SUBBITUMINOUS COAL
AND
LIGNITE FIELDS, EASTERN MONTANA
N
22
Drawn by E.A. Woode
FORT PECK INDIAN RESERVATION
GLASGOW
WOLF POINT
MISSOURI
RIVER
FORT PECK RESERVOIR
SIDNEY
PETROLEUM
GLENDIVE
LIGNITE SUBBITUMINOUS
MUSSELSHELL
MILES CITY
RIVER
YELLOWSTONE
COLSTRIP
BILLINGS
CROW INDIAN RESERVATION
NORTHERN CHEYENNE INDIAN RESERVATION
BROADUS
By: R. E. Matson

Table 1. Strippable subbituminous and lignite coal fields, eastern Montana

| No on map | Name of field | Coal bed | Est. reserves in millions of tons | Acreage | Average tons/acre | Ash[1] | Sulfur[1] | Btu[1] |
|---|---|---|---|---|---|---|---|---|
| 1 | Decker | Anderson-Dietz 1&2 | 2,239.99 | 25,523 | 87,763 | 4.0 | .40 | 9,652 |
| 2 | Deer Creek | Anderson-Dietz 1&2 | 495.65 | 14,214 | 35,397 | 4.0 | .50 | 9,282 |
| 3 | Roland | Roland | 218.04 | 12,076 | 18,055 | 9.2 | .74 | 8,164 |
| 4 | Squirrel | Roland | 133.41 | 6,208 | 21,490 | 5.5 | .29 | 7,723 |
| 5 | Kirby | Anderson | 216.52 | 5,655 | 38,285 | 4.2 | .32 | 8,328 |
| | | Wall | 473.69 | 5,952 | 79,579 | | | |
| | | Dietz | 834.35 | 17,516 | 47,630 | 5.8 | .59 | 8,509 |
| | | Canyon | 158.53 | 4,066 | 38,983 | 5.8 | .24 | 8,789 |
| 6 | Canyon | Wall | 1,884.25 | 23,859 | 78,974 | 4.6 | .30 | 9,088 |
| | | Brewster-Arnold | 65.86 | 2,067 | 31,859 | 7.5 | .40 | 8,444 |
| 7 | Birney | Brewster Arnold | 180.55 | 6,969 | 25,905 | 5.1 | .41 | 9,055 |
| 8 | Poker Jim Lookout | Anderson-Dietz | 872.65 | 19,609 | 44,501 | 5.2 | .37 | 7,925 |
| 9 | Hanging Woman Cr. | Anderson | 1,583.29 | 30,547 | 51,830 | 4.9 | .29 | 8,496 |
| | | Dietz | 1,120.96 | 43,654 | 25,678 | 5.5 | .33 | 8,078 |
| 10 | West Moorhead | Anderson | 883.74 | 19,660 | 44,949 | 5.3 | .36 | 8,296 |
| | | Dietz | 397.49 | 20,416 | 19,469 | 4.1 | .41 | 7,990 |
| | | Canyon | 690.19 | 22,547 | 30,611 | 5.6 | .45 | 8,055 |
| 11 | Poker Jim O'Dell | Knobloch | 373.29 | 7,890 | 47,311 | 5.1 | .22 | 8,846 |
| | | Knobloch | 564.78 | 7,187 | 78,581 | | | |
| 12 | Otter Creek | Knobloch | 2,075.55 | 25,791 | 80,475 | 4.7 | .36 | 8,468 |
| 13 | Ashland | Knobloch | 2,696.20 | 27,200 | 99,125 | 4.8 | .15 | 8,421 |
| | | Sawyer A & C | 357.49 | 20,262 | 17,643 | 4.9 | .49 | 7,883 |
| 14 | Colstrip | Rosebud | 1,439.26 | 33,379 | 43,118 | 9.5 | .12 | 8,836 |
| 15 | Pumpkin Creek | Sawyer | 2,426.50 | 45,695 | 53,102 | 7.5 | .34 | 7,438 |
| 16 | Foster Creek | Knobloch | 708.13 | 27,801 | 25,470 | 7.8 | .76 | 7,573 |
| | | Terret | 460.87 | 27,462 | 16,782 | 5.8 | .21 | 7,770 |
| | | Flowers-Goodale | 258.90 | 14,444 | 17,924 | 7.8 | .51 | 7,553 |
| 17 | Broadus | Broadus | 739.82 | 18,429 | 40,142 | 7.2 | .27 | 7,437 |
| 18 | East Moorhead | F | 525.21 | 15,559 | 33,756 | 6.2 | .57 | 7,120 |
| 19 | Diamond Butte | Canyon | 418.02 | 21,363 | 19,566 | 4.8 | .43 | 7,330 |
| 20 | Goodspeed Butte | Cook | 628.95 | 13,446 | 46,775 | 10.6 | 1.63 | 6,771 |
| 21 | Fire Gulch | Pawnee & Cook | 336.69 | 8,486 | 39,674 | 3.8 | .33 | 7,739 |
| 22 | Sweeney-Snyder | Terret | 326.33 | 10,921 | 29,880 | 9.1 | .11 | 8,175 |
| 23 | Yager Butte | Elk & Dunning | 1,175.86 | 26,924 | 43,673 | 4.8 | .33 | 7,646 |
| | | Cook | 312.02 | 14,507 | 21,507 | 6.7 | .63 | 7,254 |
| 24 | Threemile Buttes | Canyon & Ferry | 225.40 | 13,836 | 16,289 | 5.5 | .94 | 6,867 |
| 25 | Sonnette | Pawnee | 320.25 | 8,224 | 38,940 | 9.8 | .88 | 6,964 |
| | | Cook | 362.98 | 10,470 | 34,668 | 8.1 | 1.23 | 6,891 |
| 26 | Home Creek Butte | Canyon & Ferry | 217.21 | 4,851 | 44,774 | | | |
| 27 | Little Pumpkin Creek | Sawyer A&C, D, X, & F | 215.83 | 8,534 | 25,290 | | | |
| 28 | Sand Creek | Knobloch | 267.34 | 5,952 | 44,915 | 6.6 | .30 | 7,340 |
| 29 | Beaver-Liscom | Flowers-Goodale & Ferret | 135.87 | 8,851 | 15,350 | 8.1 | .96 | 8,102 |
| | | Knobloch | 491.62 | 17,075 | 28,791 | 7.7 | .50 | 8,027 |
| 30 | Greenleaf-Miller Creek | Rosebud, Knobloch, and Sawyer | 453.71 | 14,918 | 30,413 | 7.5 | .71 | 8,422 |
| 31 | Pine Hills | Dominy | 193.87 | 6,022 | 32,191 | 7.2 | .53 | 7,293 |
| 32 | Knowlton | Dominy (M & I) | 747.51 | 19,613 | 38,112 | 7.1 | .41 | 6,710 |
| | | Dominy (U) | 120.31 | 4,448 | 27,048 | 5.6 | .38 | 6,645 |
| 33 | Sarpy Creek | Rosebud-McKay | 1,500.00 | 42,373 | 35,400 | 6.5 | .50 | 8,600 |
| 34 | Cheyenne Meadows | Knobloch | 1,200.00 | 13,560 | 88,500 | 4.1 | .40 | 8,400 |
| 35 | Little Wolf | Rosebud-McKay | 314.00 | 7,411 | 42,370 | | | |
| 36 | Jeans Fork | | 90.00 | 3,800 | 23,685 | | | |
| 37 | Wolf Mountains | | 1,922.00 | 31,000 | 62,000 | | | |
| 38 | Lame Jones | Dominy | 150.00 | 10,593 | 14,160 | | | 6,020 |
| 39 | Lamesteer | Harmon(?) | 35.00 | 1,978 | 17,700 | | | 6,332 |
| 40 | Wibaux | C | 643.00 | 18,518 | 34,720 | 7.9 | .90 | 6,050 |
| 41 | Little Beaver | C | 134.00 | 8,445 | 15,865 | | | |
| 42 | Four Buttes | C | 91.00 | 5,180 | 17,570 | | | 6,140 |
| 43 | Hodges | | 10.00 | 807 | 12,390 | | | |
| 44 | Griffith Creek | | 10.00 | 568 | 17,700 | | | |

Table 1 Strippable subbituminous and lignite coal fields, eastern Montana

| No on map | Name of field | Coal bed | Est. reserves in millions of tons | Acreage | Average tons/acre | Ash[1] | Sulfur[1] | Btu[1] |
|---|---|---|---|---|---|---|---|---|
| 45 | Smith-Dry Creek | G | 150.00 | 8,475 | 17,700 | | | |
| 46 | O'Brian-Alkalie Creek | | 150.00 | 8,475 | 17,700 | | | |
| 47 | Breezy Flat | Pust | 200.00 | 7,062 | 30,090 | 6.7 | .50 | 6,660 |
| 48 | Burns Creek | Pust | 200.00 | 7,062 | 30,090 | | | |
| 49 | N E Thirteen Mile Creek | Pust | 225.00 | 5,085 | 44,250 | | | 6,880 |
| 50 | Fox Lake | Pust | 46.00 | 2,166 | 21,240 | | | 6,880 |
| 51 | Lane | Lane | 561.00 | 44,582 | 12,390 | | | 7,150 |
| 52 | Carroll | Carroll | 345.00 | 29,780 | 11,584 | 5.5 | .30 | 7,400 |
| 53 | Redwater River | S | 642.00 | 24,181 | 26,550 | 6.1 | .40 | 7,400 |
| 54 | Weldon-Timber Creek | S | 724 00 | 25,565 | 28,320 | | | 7,660 |
| 55 | Fort Kipp | Ft. Kipp-Ft Peck | 331.00 | 14,500 | 22,830 | 4.6 | .20 | 6,110 |
| 56 | Lanark | Lanark | 100 00 | 3,531 | 12,390 | 6.3 | .40 | 6,853 |
| 57 | Medicine Lake | | 58 00 | 3,740 | 15,510 | 7.2 | 1.00 | 6,870 |
| 58 | Reserve | | 246 00 | 18,231 | 13,495 | 7.6 | 40 | 6,599 |
| 59 | Coal Ridge | Coal Ridge | 150.00 | 19,200 | 17,700 | 7.5 | .40 | 5,830 |
| 60 | Carpenter Creek | Carpenter | 50.00 | 3,211 | 14,015 | 6.5 | .40 | 9,270 |
| 61 | Charter | Mammoth | 60.00 | 3,210 | 17,700 | 6.0 | 90 | 10,190 |
| 62 | Little Sheep Mtn | A&C | 200.00 | 10,272 | 19,470 | | | |
| | | TOTAL | 42,561.93 | 1,152,640 | | | | |

[1] "As received" basis (where more than one sample available, figures given are average figures).

By Robert E. Matson

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Coal Age, Western Coal Edition, April 1973, pp. 117-125.

Montana Public Affairs, "Forty Percent of the Nation's Coal: Development of the Northern Plains," by John R. McBride and Arnold J. Silverman, Number 16, September 1973, pp. 1-8.

Montana's Coal Resource Situation, A Summary Report to the 1969 Legislature, by S. L. Groff and Robert E. Matson, January 1969, p. 7.

Efficient movement of people and goods is a basic necessity for economic growth, as well as general well-being.

Major highways criss-cross the state connecting the major communities and commercial centers of other states. The Interstate system includes I-90 going east-west from Chicago, Minneapolis, Bismarck, through Montana to Spokane and Seattle. I-15 runs north-south from Canada through Montana to Salt Lake City and points beyond.

In addition to the Interstate, other major U.S. highways cross Montana. These include U.S. 2 along the highline running east-west just below the Canadian border and around Glacier National Park. U.S. 12 and 87 run through the middle of the state while U.S. 93 runs north-south in the western part connecting I-90 to U.S. 2 for traffic to Flathead Lake and Glacier National Park. Of course numerous state highways and county roads connect all of Montana's communities.

Railroads traverse the state. More than 5,000 miles of rail connect Montana points to other states and markets. The major lines serving the state are the Burlington Northern and the Milwaukee Railroad.

Heavy rail has been laid on the main lines and constant effort maintains the tracks in top condition for speedy freight movement.

Passenger service is also offered by Amtrak on the Burlington Northern's lines running east-west along both the north border and through the southern route across the state.

Fast freight schedules carry Montana goods to California, the Gulf Coast, Mississippi valley and to ships heading toward foreign ports.

Bus lines service all large Montana communities and most small towns. Efficient freight service as well as passenger service is offered.

Air transportation is growing in Montana. A new terminal recently opened in Billings while another is finishing completion at Great Falls. Helena, the state's capital has plans underway for a new passenger terminal while completion is scheduled for 1975 on a livestock air shipping facility adjacent to the airport.

The Port of Butte is a recently opened shipping facility specializing in containerized cargoes received directly from ships docking at Seattle, or for foreign shipments through the Seattle port. The Port of Butte offers loss cost unpacking and breaking down of shipments for distribution to other U.S. ports plus warehousing facilities.

Both the Port of Butte and Helena air facility are unique ports offering cost savings to importers and exporters serving the Northwest, Midwest and other parts of the U.S.

## FOREST PRODUCTS

A major natural and renewable resource in Montana is timber, making a significant contribution to the economy with the accompanying wood products industry. Approximately 25% of Montana (most in Western Montana) is covered with commercial forest lands. Two thirds of Montana forests are owned by the Federal Government and administered through the Forest Service of the U.S. Department of Agriculture. Shown below is a table which is a profile of timber ownership in terms of area and volume of sawtimber.

| | |
|---|---|
| Total Commercial Forest Land | 15,983,000 Acres |
| Ownership-Federal | 68.1% |
| Other Government | 3.3% |
| Private | 18.6% |
| Total Volume of Sawtimber | 12,018,000 Board feet |
| Ownership-Public | 72.9% |
| Private | 27.1% |

While private timber is held by many owners, Burlington Northern, U.S. Plywood and St. Regis Paper Co. have substantial blocks of ownership and all also operate integrated wood product plants.

The forests are mainly coniferous species and timber harvested is manufactured into a variety of wood products that are marketed primarily in the Midwestern parts of the U.S.

Lumber production in Montana in 1972 was 1.3 billion board feet with a value of $171,400.00. Nine thousand people were employed in the wood products industry in 1972.

The species harvested in 1972 were as follows:

| | |
|---|---|
| Douglas Fir & Larch | 35.9% |
| Ponderosa Pine | 19.3% |
| Engelman Spruce | 7.3% |
| Lodgepole Pine | 23.9% |
| Other | 13.6% |

Since 1950, the wood products industry has been a growth industry in Montana. Sawmills, and pole and post plants were the principle users of the timber from Montana's extensive forest lands prior to 1957. Waldorf Paper Products Company of St. Paul, Minnesota began construction of Montana's first pulp mill near Missoula in 1956.

With the construction of this plant a restructuring of the industry in Montana began. The trend was characterized by a shifting from basic sawmill operations to the further integration of the industry based on more efficient sawmill operations resulting in a greater recovering percentage of wood fiber and the utilization of wood residues in manufactured products.

Subsequent to the opening of the kraft paper mill, four plywood plants, several millwork plants and a particleboard plant began operations in Montana.

Further evidence of the trend to make more complete use of wood fiber, including residues, are plants under construction or announced. U.S. Plywood Division of Champion International Corporation is constructing the world's largest plywood plant near Missoula. Plum Creek Lumber, a subsidiary of Burlington Northern, will have a medium density fiberboard plant in operation in 1974. Hoerner Waldorf has announced a plant expansion that will increase production from 1150 to 1800 tons of paper per day.

As noted above, the wood products industry has expanded and grown in Montana. The following table showing growth in numbers of wage and salary workers illustrates the growth and shift of more integrated operations.

Wage and Salary Workers in Wood Products Industry
1950-1970

| Year | All Wood Products Industries Total | Index | Logging camps and contractors | Saw Mills and planning mills | Millwork[a] and related Products | Misc.[b] wood Products | Paper[c] and allied Products |
|---|---|---|---|---|---|---|---|
| 1950 | 5374 | 100 | 983 | 3893 | 417 | 76 | 0 |
| 1955 | 7150 | 133 | 1573 | 4991 | 475 | 107 | 4 |
| 1960 | 7406 | 129 | 1506 | 4880 | 704 | 140 | 176 |
| 1965 | 8911 | 166 | 1759 | 5315 | 1423 | 144 | 270 |
| 1966 | 9201 | 172 | 1944 | 5389 | 1359 | 180 | 329 |
| 1967 | 9064 | 169 | 1720 | 5531 | 1247 | 152 | 414 |
| 1968 | 9386 | 175 | 1878 | 5757 | 1179 | 131 | 441 |
| 1969 | 9314 | 173 | 1957 | 5661 | 1119 | 120 | 457 |
| 1970 | 8603 | 160 | 1614 | 5529 | 1148 | 134 | 478 |

a. Includes plants producing millwork, plywood, laminated wood and prefabricated buildup.

b. Includes particle board plants.

c. Includes pulpmills, paper and paperboard bills.

The trend over the years in Montana has been away from the small and medium sized sawmills to larger integrated operations. Following is a list of some of the major wood product firms operating in Montana. In addition to the major products listed, these mills and others in Montana produce processed bark, cut stock, presto logs, chemicals, posts and poles.

Brand S. Lumber Co. -- Lumber
Diamond International Corp. -- Lumber
Louisiana Pacific Corp. -- Lumber
Pack River Company -- Lumber
Stoltz Land & Lumber Co. -- Lumber
Idaho Pole Co. -- Lumber and Poles
Intermountain Co. -- Lumber and Poles
Missoula White Pine Sash -- Millwork
St. Regis Paper Co. -- Lumber and Plywood
U. S. Plywood -- lumber and Plywood
Plum Creek Lumber -- Lumber, Plywood and Fiberboard
Evans Products -- Lumber, Plywood and Particleboard
Hoerner Waldorf -- Kraft Paper

Existing wood processing plants have adequate capacity to utilize the present level timber supplies and it appears doubtful there will be any increase in timber harvested. The U.S. Forest Service has reduced the amount of timber sold in recent years to environmental considerations for better management practices. This action plus existing sawmill capacity is resulting in a capital investment in sophisticated sawmill machinery to recover a greater volume of lumber for logs and to make use of wood fiber that up to now had been considered waste.

A major opportunity in Montana today is the utilization of dead and down timber. Large areas of timber were killed many years ago by insects; some of it remains standing and some is down, but because the weather is relatively dry, a high percentage of this timber is sound and suitable for many uses. In the Bitterroot Forest south of the Missoula there is an estimated 55 million tons of this type material, and with the increasing shortages of wood fibre, many companies are seriously looking at this resource. There are other forests with large stagnated stands which the Forest Service is anxious to have removed in order to establish new, vigorous, faster growing stands of timber. Wood fibre is available in Montana with some of the imaginative projects now in evidence, such as fibreboard, flakeboard, paper, etc.

The State of Montana has a Forest Industry Consultant available for assisting companies to investigate potential projects.

TOURISM

MONTANA, is the Great Vacation Escape . . . an escape to acres of wilderness and back country living, an escape to uncrowded highways, an escape to campgrounds, an escape to fresh pure water and air that's never been breathed before, an escape to the uncluttered life.

Montana is a vast paradox . . . actually two states in one. The east is rolling prairies, colorful badlands, cattle and oil country . . . much of whose history and development centers around two of the nation's great rivers: the Missouri and the Yellowstone. It was in eastern Montana where Pierre Wiabaux became one of the world's largest cattle raisers after giving up a silk and dye industry in France to "go west". It was in eastern Montana where Lt. Col. George A. Custer and every member of his command met defeat at the hands of Sioux and Cheyenne warriors in the valley of the Little Bighorn River. The Custer Battlefield is now a National Monument. It was in eastern Montana where Captain William Clark carved his name on a great sandstone pillar in 1805. Pompeys Pillar is today the only remaining physical evidence of the Lewis and Clark expedition as it traversed the Louisiana Purchase. Today's eastern Montana welcomes visitors with sightseeing on Indian Reservation, rodeos, wild horse sales, rockhounding, float trips, and plenty of hunting and fishing.

Western Montana is something else . . . towering mountains, shimmering lakes, over 16 million acres of public land in 11 national forest, blue ribbon trout streams and Glacier National Park. It was in the western section of the state where western artist, Charles M. Russell lived and painted until his death in 1926. It was in Western Montana that GOLD was king in the late 19th century, where vigilantees, stage robbers and millionaires flourished and left a heritage that has never died. It was in western Montana where Lewis and Clark

discovered the birthplace of the Missouri River. Today that birthplace, Three Forks, is a State Monument. It was in western Montana where Chief Joseph of the Nez Perce encountered the U.S. Army in a historic battle in 1877. Western Montana saw the state's first white settlement, its discovery of gem sapphires, and its wealth of copper in Butte, "the richest hill on earth". Today's western Montana welcomes visitors with modern dude and guest ranches, hiking, back-packing, float trips, excellent fishing and hunting, rodeos, rockhounding, skiing, snow-mobiling, and ghost-town exploring. All of Montana invites you to escape .... to enjoy the west as it was .... and the west as it is .... friendly, wide-open, spacious and fun.

Montana proudly boasts two of America's most famous National Parks -- Yellow-stone and Glacier.

GLACIER NATIONAL PARK

Lying in its entirety in a rugged section of the MONTANA Rockies, Glacier National Park has approximately 40 glaciers and 200 glacial lakes. Crystal clear streams offer superb fishing and no license is required. Fields of brillant mountain wild flowers, cascading waterfall, sheer cliffs, dense forests, black and grizzly bears, marmots, and noble mountain goats and mountain sheep offer a multi dimensional panorama. Going-to-the-Sun Road, a spectacular eastwest 50-mile drive, crosses the Continental Divide at Logan Pass and traverses the towering Garden Wall. It opens around the first week in June and remains open well into October. Much of the park is easily accessible by car and nearly a thousand miles of hiking trails lead deep into back country magnificence. All year-round accommodations are available on the park's entrances. Accommodations in the park are available from about June 10 -- September 10. This million-acre wonderland was established as a National Park

by Congress May 11, 1910, and is the U.S. section of the Wateron-Glacier International Peace Park. Glacier National Park is administered by the U.S. National Park Service.

YELLOWSTONE NATIONAL PARK

Three of the five entrances to Yellowstone, the largest and oldest of all the National Parks, are in Montana: (1) Gardiner on U.S. 89, (2) the Beartooth Highway (U.S. 212) and (3) U.S. Highways 191 and 287. Yellowstone was established 100 years ago . . . . the park and the National Park System celebrated a joint centennial in 1972. Yellowstone, the sight of Old Faithful, is renowned for spouting geysers, brillant turquoise pools, bubbling mud cauldrons, rugged mountains, canyons, rushing streams, cold water lakes, extensive forests and waterfalls of irresistable fascination that offer photographers a paradise. Park wildlife includes buffalo, moose, elk, deer, antelope, bighorn sheep, grizzly and black bear. Snowmobile trips operate from mid-December to mid-March from West Yellowstone, Montana and Mammoth, Wyoming. Accommondations are open in the park from about May 1 to October 31 and special winter accommodations are available at Gardiner and West Yellowstone, Montana and surrounding communities. Yellowstone National Park is administered by the National Park Service.

Montana invites worldwide visitors to enjoy the splendor of the Big Sky with the following services:

The Convention and Tour Office of the State of Montana is a new function of the State Advertising Unit. It is especially designed to coordinate the activities of group travel between the private sector and the state level. The qualified staff is able to provide information about Montana and especially the travel industry.

A tour shell has been produced by the Convention and Tour Office which is available to tour companies that wish to imprint a specific tour program. This blank shell may be purchased at the cost of $.03 per shell or $30.00 per thousand shells. A sample is enclosed following this report. To obtain a supply please write:

Tour Shells
Convention and Tour Office
Drawer "C"
Department of Highways
Helena, Montana 59601

The Old West Trail film, translated in Japanese, is also available for showing, through the Convention & Tour Office.

The following tours are representative of the kind of tours now being wholesaled in Montana:

American Plains Indian Tours, Inc.
Box 2185
Great Falls, Montana 59401

Features escorted tours sponsored by the Crow Indian Tribe in Montana. Tour options include; 5 day, 7 day and 14 day tours. Highlights of tours are overnight stay at a guest ranch, stop at Crow Indian Reservation and Custer Battlefield, a vacation with a western flavor.

Montana Tours, Inc.
14 Knob Road
Havre, Montana 59501

Six and twelve day tours are available. Tours are especially designed to accommodate Japanese visitors and include cross section of Western Montana featuring scenery, industry, ghost towns, and museums.

Montana Tour and Travel
230 Avenue East
Kalispell, Montana 59901

"Between Glacier and Yellowstone" and "Super Adventure Vacation" tours are featured. The latter offers the unique vacation adventure -- sky diving (training included), ballon ride, float trip, skin diving with other exciting options.

Shining Mountains Tours
P. O. Box 1141
Kalispell, Montana 59901

Tour especially adapted to those wishing to visit Expo "74", featuring a seven day tour geared to the western history visitor. Montana side trip options are available in all areas of Montana.

Voyages West
P. O. Box 459
Bozeman, Montana 59715

Forty-eight scheduled departure times from West Yellowstone or Bozeman, Montana. Tour highlights Yellowstone Park and beautiful and historic southwestern Montana.

Montana -- Land of the Big Sky is a unique location for your next meeting. The excitement and mystery of the West offers a perfect setting for productive meetings in an atmosphere of relaxation.

Major air carriers provide easy accessibility through Seattle as well as other West Coast gateway cities.

Montana's cities are modern and interesting. Our resort complexes are unexcelled in the West. Convention facilities can accommodate the smaller corporate meeting to the large incentive groups in true Western style.

Montana is easy to get to -- listed below is general transportation information relating to the Big Sky Country.

Airlines Serving Montana
Frontier
Hughes Airwest
Northwest Orient
Western Airlines

Major U.S. and Canadian Gateway Cities to Montana are:

| | |
|---|---|
| Calgary | San Francisco |
| Los Angeles | Seattle |
| Portland | Vancouver |

The following Montana Cities have commercial air services:

| | | |
|---|---|---|
| Billings | Great Falls | Miles City |
| Bozeman | Havre | Missoula |
| Butte | Helena | Sidney |
| Glasgow | Kalispell | West Yellowstone (seasonal) |
| Glendive | Lewistown | Wolf Point |

Montana is served by the National Railroad Passenger Corporation. (AMTRAK)

The following map shows the rail routes and air ports.

Montana is served by many bus companies. For information and charter rates or scheduled service please contact the Convention and Tour Office.

Autos and campers are available for rental at most of the major airports. This information is available through the Convention and Tour Office or direct with the various rental agencies.

## MANUFACTURING

Manufacturing in Montana is primarily based upon the processing of raw materials; the refining of copper, aluminum, petroleum, and lead; the production of elemental phosphorus and cement; and the manufacture of wood products. The upgrading of agricultural products, such as beet sugar refining, flour milling, and livestock processing, is also very important. Mentioned, in preceding sections of this report, are some of the manufacturing and processing associated with Montana's agriculture, mineral and wood products industries. Other products manufactured in Montana range from small electronic components to farm machinery, including large tractors. Nevertheless, most of Montana's manufacturing firms are rather small, serving local markets.

Approximately 24,500 persons are employed in manufacturing within Montana and the value added by manufacturing approximates $400 million annually. However, it is estimated that Montana annually exports only about $20 million worth of these products to foreign countries. While the volume of manufactured goods shipped in international trade has not been large, there is evidence that a number of firms have been aggressive in international trade activities.

Approximately 725 firms are listed in the latest Directory of Montana Manufacturers (copy enclosed). Listed below are those companies which employ 50 or more persons in the categories of agriculture, minerals and timber, and they represent most of the largest firms in the State.

Agriculture

Conagra Montana, Inc., Great Falls
General Mills, Great Falls
Great falls Meat Co., Great Falls
Great Western Sugar Co., Billings
Holly Sugar Co., Sidney
John R. Daily, Inc., Missoula
Midland Empire Packing Co., Billings

Minerals

American Smelting & Refining Co., East Helena
Anaconda Co., Butte
Columbia Paint Co., Helena
Continental Oil Co., Billings
Exxon Co., Billings
Farmers Union Central Exchange, Laurel
Ideal Cement Co., Trident
Kaiser Cement Co., Helena
Phillps Petroleum Co., Great Falls
Stauffer Chemical Co., Butte
W. R. Grace Co., Libby
Westco Refining Co., Cut Bank

Timber

C & C Plywood Co., Kalispell
U. S. Plywood Division, Bonner
Del Connor Lumber, Inc., Darby
Diamond International Corp., Superior
Evans Products Co., Missoula
Hoerner Waldorf Corp., Missoula
Idaho Pole Co., White Sulphur Springs
Intermountain Lumber Co., Missoula
Louisiana Pacific Co., Philipsburg
Pack River Lumber Co., Polson
Plum Creek Lumber Co., Columbia Falls
St. Regis Paper Co., Libby
Stoltze Land & Lumber Co., Columbia Falls
Yellowstone Pine Co., Belgrade

Information obtained from Montana's manufacturing companies indicated that 47 of them frequently ship products to foreign countries (primarily to Canada, but also to Mexico, England, Japan, Australia, West Germany, France etc.). In addition, 5 other Montana manufacturers occasionally ship products to foreign countries. The major types of manufactured products which are exported from Montana are primary metals, agricultural implements, meat products, and wood products. In many cases, the processors of raw materials in Montana are branch plants of large American firms which deal in international trade and most likely have trade with Japanese companies.

The following is a list of Montana firms known to be exporting, together with the major products exported and the foreign countries to which their products are shipped.

| Company | Product & Country |
|---|---|
| American Chemet Corporation<br>1517 Dodge<br>Helena, Montana 59601 | Copper oxides to Belgium and West Germany and zinc oxides to Canada |
| American Dental Mfgr. Co.<br>1201 S. 6th West<br>Missoula, Montana 59801 | Dental instruments to West Germany |
| American Smelting & Refining Co.<br>East Helena, Montana 59635 | Products to foreign refineries |
| Anaconda Company<br>P. O. Box 151<br>Great Falls, Montana 59403 | Copper cathodes and shapes to Japan and Europe |
| P. J. Anderson & Sons<br>Box 458<br>Conrad, Montana 59425 | Vegetable oil to Japan and the Netherlands |

| Company | Product & Country |
|---|---|
| Armor Metal Products<br>Box 822<br>Helena, Montana 59601 | Rock pickers to the Free World and CTinerd Rod Weeders to Canada |
| Dan Bailey's Fly Shop<br>209 W. Park St. | Fishing flies to various countries |
| B & B Industries, Inc.<br>710 Stephens Avenue<br>Missoula, Montana 59801 | Glass cutters to Bolivia, Egypt, and Tunisia |
| BGK Industries, Inc.<br>Columbia Falls, Montana 59912 | Sliding doors to Canada |
| Big West Oil Co.<br>Kevin, Montana 59454 | Road oil to Canada |
| Cascade Coach Company, Inc.<br>Box 261<br>Great Falls, Montana 59403 | Campers and trailers to Canada |
| Contway Bronze<br>Rt. 1 West | Bronze Sculptures to Canada |
| Crisafulli Pump Co.<br>Box 1051<br>Glendive, Montana 59330 | Water pumps to Canada and Vietnam |
| Flint Valley Forest Products, Inc.<br>Box 580<br>Philipsburg, Montana 59858 | Lumber studs to Canada |
| Fly's<br>Box 63<br>Ovando, Montana 59854 | Veterinary surgery tables to Canada |
| Forzley Sales, c.<br>930 River Drive St.<br>Great Falls, Montana 59403 | Building stone to Canada |
| Eva Gates Homemade Preserves<br>Bigfork, Montana 59911 | Preserves to Canada, Ireland, England and Holland on special orders |
| Roy Gfeeler<br>Rt. 1, Box 18<br>Polson, Montana 59860 | Leather field equipment to various countries |

| Company | Products & Country |
| --- | --- |
| Glendive Saddlery<br>117 No. Merrill Avenue<br>Glendive, Montana 59330 | Saddles to Canada and Australia |
| Gold Bond Industries, Inc.<br>Box 2128<br>Great Falls, Montana 59403 | Floor waxes to Canada |
| W. R. Grace & Co.<br>Box 609<br>Libby, Montana 59923 | Vermiculite to Canada, Japan, and Europe |
| Great Falls Meat Co.<br>Box 1526<br>Great Falls, Montana 59403 | Tallow to the Orient, beef offal to the British Islands, and meat meal to Canada. |
| Great Falls Tent & Awning<br>611 8th Avenue North<br>Great Falls, Montana 59401 | Products to Canada |
| Great Falls Iron Works<br>1315 8th Ave., No.<br>Great Falls, Montana 59401 | Water treating plants to various countries |
| I-Deal Ideas, Inc.<br>Box 14<br>Pablo, Montana 59855 | Saddle pads, etc., to Canada, Australia and New Zealand |
| Ideal Mgfr. Co.<br>1207 Highway 10E<br>Billings, Montana 59103 | Portable cement plant and silo to Canada and Mexico |
| Pfizer, Inc.<br>Box 1147<br>Dillon, Montana 59725 | Ground talc to Canada |
| Pierce Packing Co.<br>Box 1677<br>Billings, Montana 59103 | Meat Products to foreign countries |
| Plastic Shop<br>630 W. Mercury<br>Butte, Montana 59701 | Surveyor's backsights to Canada, Australia and South America |
| Plum Creek Lumber<br>Box 188<br>Pablo, Montana 59855 | Lumber to Canada and Germany |

| Company | Products & Country |
| --- | --- |
| Rocky Mountain Campers, Inc.<br>Box 1247<br>Great Falls, Montana 59403 | Recreation Campers to Canada |
| S & L Logging Corporation<br>Box 1093<br>Kalispell, Montana 59901 | Logs to foreign countries |
| Snow Line Tree Co., Inc.<br>Box 915<br>Kalispell, Montana 59901 | Nursery stock and Christmas trees to Canada |
| Summit Engineering Corp.<br>1820 So. 7th Ave.<br>Bozeman, Montana 59715 | Electronic components to various countries |
| A. E. Thorson & Sons, Mfg.<br>Corvallis, Montana 59828 | Stock chutes to Canada |
| Tri-Trun International<br>Box 1861<br>Billings, Montana 59103 | Electronic water treatment equipment to Canada, Holland, Singapore, and Switzerland |
| Titan RBM Corporation<br>South Wasington Ave.<br>Havre, Montana 59520 | Electronic components to Mxxico |
| Unites Sierrra Division<br>Cyprus Mines Corp.<br>Three Forks, Montana 59752 | Industrial talc to foreign countries |
| U. S. Gypsum Co.<br>Health Star Route<br>Lewistown, Montana 59457 | Gypsum wallboard to Canada |
| Viel Manufacturing Company<br>Box 632<br>Billings, Montana 59103 | Rock pickers shipped to various countries |
| Wood's Powr-Grip Co., Inc.<br>Box 68<br>Wolf Point, Montana 59201 | Vacuum grippers and lifters to Canada, France, Germany and Switzerland |

Included in an overall list of products made in Montana are such items as mechanical rock pickers, rock windrowers, irrigation ditches and fillers, plows, weeders, water pumps, beef, pork, trout and trout snacks, food seasoning, vegetable oils, dental hand instruments, dimension lumber, pulp & paper, plywood, particleboard, laminated beams, mobile homes, vacation trailers, pickup campers, prepared feeds for animal and fowls, pens and pencils, vacuum glass lifters, and vermiculite.

# POTENTIAL OPPORTUNITIES

# FOR INVESTMENT

# IN MONTANA

I. Agriculture

- A. Livestock
  - 1. Swine production
  - 2. Cattle feeding
    - a. Commcercial feedlots
    - b. Consignment feeding
    - c. Meat packing
  - 3. Poultry
  - 4. Trout
  - 5. Mushrooms
  - 6. Live cattle
- B. Land development
  - 1. Irrigation
  - 2. Cash crop contracting
- C. Grain production & conversion
  - 1. Flour milling
  - 2. Starch plants
  - 3. Oil seed crops
    - a. Mustard seed
    - b. Safflower
    - c. Crambe
  - 4. Grain storage

II. Minerals

- A. Coal
  - 1. Export
  - 2. Conversion
    - a. Mine mouth generation
    - b. MHD
    - c. Gasification

d. Liquefaction
e. Nuclear Enrichment
f. Form coking
g. Petrochemicals

1. Fertilizer
2. Basic chemicals
3. Synthetic fabrics

B. Iron & Steel

1. Mini-mill-recycling
2. Pelletizing
3. Stainless steel

C. Non-metallics

1. Bentonite
2. Vermiculite
3. Asbestos
4. Clays
5. Rare earths
6. Phosphate fertilizer

III. Wood Products

A. Conversion

1. Plywood
2. Particleboard
3. Chip-board-flakeboard (wood residues)
4. Paper and pulp

B. Manufacturing

1. Cut-up plants
2. Furniture
3. Housing

IV. Recreation

A. Destination Resort Development

B. Tourism

1. Company employee tours
2. Tourist agencies
3. Company conferences

V. Manufacturing

A. Clothing

B. Plastics

C. Electronic Components

D. High Technology -- Research support from Montana State University

VI. Trade

A. Port of Butte

B. Agriculture products

C. Trade organization participation